Claims

1. A method for manufacturing a reinforcing structure for tyres of vehicles, comprising the following steps:

preparing strip-like segments (5) each comprising longitudinal filiform elements arranged in mutually parallel fashion at least partially coated by at least a layer of elastomeric material;

applying the strip-like segments (5) in mutually approached relationship along the circumferential development of a toroidal support (3), to form at least a reinforcing layer (2) having continuous circumferential development about a geometric axis of rotation (X-X),

characterised in that

during the application of each of said strip-like segments (5), a relative angular rotation is brought about, between the strip-like segment itself and the toroidal support (3), about an axis of correction (Y-Y) substantially radial to said geometric axis of rotation (X-X).

2. A method as claimed in claim 1, wherein the angular rotation about the axis of correction (Y-Y) is effected in a progressive manner in the course of the application of the strip-like segment 5.

3. A method as claimed in claim 1, wherein the angular rotation about the axis of correction (Y-Y) is controlled in the course of the application of each strip-like segment (5), to cause the application of the segment itself according to an orthodromic trajectory with respect to the exterior surface of the toroidal support (3).

4. A method as claimed in claim 1, wherein said relative angular rotation is obtained by the actuation of the toroidal support (3).

5. A method as claimed in claim 1, wherein the axis of correction (Y-Y) about which said angular rotation is carried out lies in an equatorial plane of the toroidal support (3).

6. A method as claimed in claim 1, wherein the axis of correction (Y-Y) about which said angular rotation is carried out is situated in a barycentric position relative to the strip-like segment (5) which is about to be applied onto the toroidal support (3).

7. A method as claimed in claim 1, wherein the preparation of said strip-like segments (5) is carried out by means of cutting actions sequentially executed on at least a continuous strip-like element (6) incorporating said filiform elements in said layer of elastomeric material.

8. A method as claimed in claim 6, wherein each cutting action is followed by the application onto the toroidal support (3) of the single segment (5) thereby obtained.

9. A method as claimed in claim 1, wherein the individual strip-like segments (5) are sequentially positioned on the toroidal support (3) according to a circumferential distribution pitch corresponding to the width of the strip-like segments themselves, measured in correspondence with an equatorial plane of the toroidal support itself.

10. Method as claimed in claim 1, wherein the application of each strip-like segment (5) provides for the following steps:

laying the strip-like segment (5) transversely relative to an equatorial plane of the toroidal support (3);

radially approaching the strip-like segment (5) to the toroidal support (3);

rotating the toroidal support (3) according to an angular pitch corresponding to the circumferential distribution pitch of the strip-like segments (5).

11. A method as claimed in claim 10, further comprising a step whereby each strip-like segment (5) is pressed against the toroidal support (3), said pressing operation being initially carried out in proximity to a central portion of the respective strip-like segment (5) and subsequently extended towards the opposite extremities of the strip-like segment itself.

12. A method as claimed in claim 11, wherein said pressing step is carried out simultaneously with said approaching step.

13. A method as claimed in claim 1, wherein each toroidal support (3) is constituted by a previously formed carcass structure.

14. A method as claimed in claim 1, further comprising at least a step whereby a carcass structure is manufactured on the toroidal support (3), said application on the toroidal support (3) being carried out by laying each strip-like segment (5) onto said carcass structure.

15. An apparatus for manufacturing a reinforcing structure for tyres of vehicles, comprising:

a unit (4) for feeding strip-like segments (5) each comprising filiform elements arranged in mutually parallel fashion at least partially coated by at least a layer of elastomeric material;

a laying unit (10) for applying each of said strip-like segments (5) onto a toroidal support (3), according to a pre-set laying angle (α) relative to a direction of circumferential development of the toroidal support itself

first angular actuation devices to cause a relative motion between the laying unit (10) and the toroidal support (3), about a geometric axis (X-X) of the toroidal support itself, characterised in that it further comprises

second angular actuation devices able to be activated during the application of each strip-like segment (5) to cause, between the strip-like segment itself and the toroidal support (3), a relative rotation about an axis of correction (Y-Y) substantially radial to said geometric axis of rotation (X-X).

16. An apparatus as claimed in claim 15, wherein said second angular actuation devices are operatively interpolated with said laying unit (10) to cause the application of each segment (5) according to a substantially orthodromic trajectory relative to the exterior surface (3a) of the toroidal support (3).

17. An apparatus as claimed in claim 15, wherein said second actuation devices are mechanically connected to said toroidal support (3) to rotate the latter angularly about said axis of correction (Y-Y).

18. An apparatus as claimed in claim 15, wherein said axis of correction (Y-Y) lies substantially in an equatorial plane of the toroidal support (3).

19. An apparatus as claimed in claim 15, wherein said feeding unit (4) comprises:

a cutting organ (7) operating on a continuous strip-like element (6) to obtain said strip-like segments (5) therefrom;

a gripping organ (8) movable between a first operative position wherein it engages a terminal end (6a) of said continuous strip-like element (6) in proximity to the cutting organ (7), and a second operative position wherein it is removed from the cutting organ (7) to extend the continuous strip-like element (6) beyond the cutting organ itself, according to a segment whose length corresponds to that of the strip-like segment (5) to be obtained.

20. An apparatus as claimed in claim 19, wherein said laying unit (10) comprises at least a presser element (11) movable in contrast relationship

against the exterior surface (3a) of the toroidal support (3) to cause the application of the strip-like segment (5).

21. An apparatus as claimed in claim 20, wherein said laying unit comprises:

at least two of said presser elements (11) each borne by a respective support element (12);

a guide structure (13) bearing said support blocks (12);

radial actuation devices for translating the presser elements (11) in radial approach to the exterior surface (3a) of the toroidal support (3);

transverse actuation devices for translating the presser elements (12) between a first operative condition wherein they are mutually approached and a second operative condition wherein they are removed relative to the equatorial plane of the toroidal support (3).

22. An apparatus as claimed in claim 21, further comprising auxiliary holding elements (14) for holding the strip-like segment (5) cut off by said cutting organ (7).

23. An apparatus as claimed in claim 22, wherein said auxiliary holding elements (14) are movable relative to the presser elements (11) in a direction substantially radial to the toroidal support (3).